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ANALYSIS REPORT

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Integral Consulting Inc.
Suite 190
285 Century Place
Louisville CO 80027

Report Date: July 09, 2018 10:51

Project: Solvay

Account #: 20003
Group Number: 1958565
State of Sample Origin: NJ

To view our laboratory's current scopes of accreditation please go to http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/ . Historical copies may be requested through your project manager.

Electronic Copy To	Solvay	Attn: Mitch Gertz
Electronic Copy To	Solvay	Attn: Mark Christensen
Electronic Copy To	Integral Consulting Inc.	Attn: Erin Palko
Electronic Copy To	Integral Consulting Inc.	Attn: Craig Hutchings

Respectfully Submitted,

Lyssa M. Longenecker

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Specialist

(717) 556-7321

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SAMPLE INFORMATION

Client Sample Description	Sample Collection Date/Time	ELLE#
V-915 Water	06/21/2018 09:00	9674128
Field Blank Water	06/21/2018 09:00	9674129

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Sample Description: **V-915 Water**

Project Name: **Solvay**

Integral Consulting Inc.
ELLE Sample #: **WW 9674128**
ELLE Group #: **1958565**
Matrix: Water

Submittal Date/Time: 06/22/2018 09:50
Collection Date/Time: 06/21/2018 09:00

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1 Modified**		**ng/l**	**ng/l**	**ng/l**	
14473	Perfluorobutanesulfonate	375-73-5	N.D.	0.26	0.86	1
14473	Perfluorodecanoic acid	335-76-2	11	0.86	1.7	1
14473	Perfluorododecanoic acid	307-55-1	0.40 J	0.26	0.86	1
14473	Perfluoroheptanoic acid	375-85-9	17	0.26	0.86	1
14473	Perfluorohexanesulfonate	355-46-4	1.0 J	0.34	1.7	1
14473	Perfluorohexanoic acid	307-24-4	14	0.34	1.7	1
14473	Perfluorononanoic acid	375-95-1	1,300	3.4	17	10
14473	Perfluoro-octanesulfonate	1763-23-1	3.6	0.34	1.7	1
14473	Perfluorooctanoic acid	335-67-1	170	0.26	0.86	1
14473	Perfluorotetradecanoic acid	376-06-7	N.D.	0.26	0.86	1
14473	Perfluorotridecanoic acid	72629-94-8	0.37 J	0.26	0.86	1
14473	Perfluoroundecanoic acid	2058-94-8	34	0.34	1.7	1

Sample Comments

State of New Jersey Lab Certification No. PA011

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14473	PFAS in Water by LC/MS/MS	EPA 537 Version 1.1 Modified	1	18176003	07/02/2018 20:41	Devon M Whooley	1
14473	PFAS in Water by LC/MS/MS	EPA 537 Version 1.1 Modified	1	18176003	07/05/2018 19:27	Devon M Whooley	10
14091	PFAS Water Prep	EPA 537 Version 1.1 Modified	1	18176003	06/25/2018 07:00	Pamela Rothharpt	1

*=This limit was used in the evaluation of the final result

Sample Description: **Field Blank Water**

Project Name: **Solvay**

Integral Consulting Inc.
ELLE Sample #: **WW 9674129**
ELLE Group #: **1958565**
Matrix: Water

Submittal Date/Time: 06/22/2018 09:50
Collection Date/Time: 06/21/2018 09:00

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1 Modified**		**ng/l**	**ng/l**	**ng/l**	
14473	Perfluorobutanesulfonate	375-73-5	N.D.	0.27	0.90	1
14473	Perfluorodecanoic acid	335-76-2	N.D.	0.90	1.8	1
14473	Perfluorododecanoic acid	307-55-1	N.D.	0.27	0.90	1
14473	Perfluoroheptanoic acid	375-85-9	N.D.	0.27	0.90	1
14473	Perfluorohexanesulfonate	355-46-4	N.D.	0.36	1.8	1
14473	Perfluorohexanoic acid	307-24-4	N.D.	0.36	1.8	1
14473	Perfluorononanoic acid	375-95-1	1.2 J	0.36	1.8	1
14473	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.36	1.8	1
14473	Perfluorooctanoic acid	335-67-1	N.D.	0.27	0.90	1
14473	Perfluorotetradecanoic acid	376-06-7	N.D.	0.27	0.90	1
14473	Perfluorotridecanoic acid	72629-94-8	N.D.	0.27	0.90	1
14473	Perfluoroundecanoic acid	2058-94-8	N.D.	0.36	1.8	1

The recovery for the extraction standard(s) is outside the QC acceptance limits as noted on the QC Summary. Sufficient sample was not available to repeat the analysis.

Sample Comments

State of New Jersey Lab Certification No. PA011

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14473	PFAS in Water by LC/MS/MS	EPA 537 Version 1.1 Modified	1	18176003	07/02/2018 20:56	Devon M Whooley	1
14091	PFAS Water Prep	EPA 537 Version 1.1 Modified	1	18176003	06/25/2018 07:00	Pamela Rothharpt	1

*=This limit was used in the evaluation of the final result

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Quality Control Summary

Client Name: Integral Consulting Inc. Group Number: 1958565
Reported: 07/09/2018 10:51

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

Method Blank

Analysis Name	Result	MDL**	LOQ
	ng/l	ng/l	ng/l
Batch number: 18176003	Sample number(s): 9674128-9674129		
Perfluorobutanesulfonate	N.D.	0.30	1.0
Perfluorodecanoic acid	N.D.	1.0	2.0
Perfluorododecanoic acid	N.D.	0.30	1.0
Perfluoroheptanoic acid	N.D.	0.30	1.0
Perfluorohexanesulfonate	N.D.	0.40	2.0
Perfluorohexanoic acid	N.D.	0.40	2.0
Perfluorononanoic acid	N.D.	0.40	2.0
Perfluoro-octanesulfonate	N.D.	0.40	2.0
Perfluorooctanoic acid	N.D.	0.30	1.0
Perfluorotetradecanoic acid	N.D.	0.30	1.0
Perfluorotridecanoic acid	N.D.	0.30	1.0
Perfluoroundecanoic acid	N.D.	0.40	2.0

LCS/LCSD

Analysis Name	LCS Spike Added ng/l	LCS Conc ng/l	LCSD Spike Added ng/l	LCSD Conc ng/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 18176003	Sample number(s): 9674128-9674129								
Perfluorobutanesulfonate	4.81	4.89	4.81	4.88	102	101	73-128	0	30
Perfluorodecanoic acid	5.44	6.21	5.44	6.22	114	114	69-148	0	30
Perfluorododecanoic acid	5.44	5.39	5.44	5.97	99	110	75-136	10	30
Perfluoroheptanoic acid	5.44	5.21	5.44	5.54	96	102	76-140	6	30
Perfluorohexanesulfonate	5.14	4.93	5.14	4.95	96	96	71-131	0	30
Perfluorohexanoic acid	5.44	5.30	5.44	5.38	97	99	75-135	1	30
Perfluorononanoic acid	5.44	5.53	5.44	5.76	102	106	72-148	4	30
Perfluoro-octanesulfonate	5.20	4.67	5.20	4.94	90	95	67-138	6	30
Perfluorooctanoic acid	5.44	5.74	5.44	5.68	106	105	72-138	1	30
Perfluorotetradecanoic acid	5.44	5.68	5.44	5.64	104	104	74-135	1	30
Perfluorotridecanoic acid	5.44	5.34	5.44	5.50	98	101	61-145	3	30
Perfluoroundecanoic acid	5.44	4.97	5.44	4.97	91	91	75-146	0	30

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

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Quality Control Summary

Client Name: Integral Consulting Inc. Group Number: 1958565
Reported: 07/09/2018 10:51

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: PFAS in Water by LC/MS/MS
Batch number: 18176003

	13C3-PFBS	13C5-PFHxA	13C3-PFHxS	13C4-PFHpA	13C8-PFOA	13C8-PFOS
9674128	141	73	89	85	76	102
9674129	85	105	91	99	106	113
Blank	84	84	78	80	89	88
LCS	90	96	93	96	101	99
LCSD	84	90	88	90	97	97
Limits:	26-148	31-128	34-126	35-126	43-112	43-115

	13C9-PFNA	13C6-PFDA	13C7-PFUnDA	13C2-PFDoDA	13C2-PFTeDA
9674128	88	77	82	99	84
9674129	159*	96	86	114	124*
Blank	95	81	80	85	77
LCS	103	100	99	107	96
LCSD	102	90	96	97	86
Limits:	32-134	40-115	30-128	28-127	26-119

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

9-20003
6-1958565
5-967428-30

CHAIN OF CUSTODY RECORD
SOLVAY SOLEXIS, INC.
Thorofare, New Jersey

Rev. 2 (11/06)

Date	Time	# of Containers	Sample Identification	PFAA by LC/MS/MS pH	T.D.S.	T.S.S.	TOTAL FLUORIDE	TOTAL CHLORIDE	O & G	C.O.D.	T.O.C.	B.O.D.	TOTAL METALS Zn, Cu, As, Be, Cd, Cr, Pb, Hg, Ni	TOTAL Cn	V.O.A. EPA 624	V.O.A. EPA 624 (NOTE: 1)	V.O.A. 603 ACRYLONITRILE ONLY	B.N.A. EPA 625	SLUDGE CAKE ORGANICS (NOTE: 2)
			See Stacy Hess with any questions		Analysis Requested														
6/21/18	0900	2	V-915	X															
6/21/18	0900	1	Field Blank	X															

Remarks: (Note: 1) 3 Compounds: Tetrachloroethylene, Trichloroethylene, 1,2 Dichloroethane
(Note: 2) 5 Compounds: Chloroform, 1,2 Dichloroethane, Methylene Chloride, Tetrachloroethylene, Trichloroethylene

☐ 3 Day Turnaround. Fax to ( ) –

	Date:	Time:	Received By:
	6/21/18	1500	
Relinquished By:	Date:	Time:	Received By:
Relinquished By:	Date:	Time:	Received By:

White – Lab Copy Canary – File Copy Pink – Return Copy

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Sample Administration Receipt Documentation Log

Doc Log ID: 219902

Group Number(s): 1958565

Client: SOLVAY SOLEXIS

Delivery and Receipt Information

Delivery Method:	Fed Ex	Arrival Timestamp:	06/22/2018 9:50
Number of Packages:	1	Number of Projects:	1

Arrival Condition Summary

Shipping Container Sealed:	Yes	Sample IDs on COC match Containers:	Yes
Custody Seal Present:	No	Sample Date/Times match COC:	Yes
Samples Chilled:	Yes	VOA Vial Headspace ≥ 6mm:	N/A
Paperwork Enclosed:	Yes	Total Trip Blank Qty:	1
Samples Intact:	Yes	Trip Blank Type:	N/A
Missing Samples:	No	Air Quality Samples Present:	No
Extra Samples:	No		
Discrepancy in Container Qty on COC:	No		

Unpacked by Suegeily Mendez (14058) at 13:04 on 06/22/2018

Samples Chilled Details

Thermometer Types: DT = Digital (Temp. Bottle) IR = Infrared (Surface Temp) All Temperatures in °C.

Cooler #	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?
1	DT42-01	2.4	DT	Wet	Y	Bagged	N

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Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

BMQL	Below Minimum Quantitation Level	**mL**	milliliter(s)
C	degrees Celsius	**MPN**	Most Probable Number
cfu	colony forming units	**N.D.**	non-detect
CP Units	cobalt-chloroplatinate units	**ng**	nanogram(s)
F	degrees Fahrenheit	**NTU**	nephelometric turbidity units
g	gram(s)	**pg/L**	picogram/liter
IU	International Units	**RL**	Reporting Limit
kg	kilogram(s)	**TNTC**	Too Numerous To Count
L	liter(s)	**µg**	microgram(s)
lb.	pound(s)	**µL**	microliter(s)
m3	cubic meter(s)	**umhos/cm**	micromhos/cm
meq	milliequivalents	**MCL**	Maximum Contamination Limit
mg	milligram(s)		

<	less than
>	greater than
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.
ppb	parts per billion
Dry weight basis	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as “analyze immediately” are not performed within 15 minutes.

WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL, LLC BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL AND (B) WHETHER EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.

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Data Qualifiers

Qualifier	Definition
C	Result confirmed by reanalysis
D1	Indicates for dual column analyses that the result is reported from column 1
D2	Indicates for dual column analyses that the result is reported from column 2
E	Concentration exceeds the calibration range
K1	Initial Calibration Blank is above the QC limit and the sample result is ND
K2	Continuing Calibration Blank is above the QC limit and the sample result is ND
K3	Initial Calibration Verification is above the QC limit and the sample result is ND
K4	Continuing Calibration Verification is above the QC limit and the sample result is ND
J (or G, I, X)	Estimated value >= the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P	Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U	Analyte was not detected at the value indicated
V	Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference.
W	The dissolved oxygen uptake for the unseeded blank is greater than 0.20 mg/L.
Z	Laboratory Defined - see analysis report

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods.
Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.